R E P O R T R E S U M E S

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A STUDY OF THE STATUS AND ROLE OF THE JUNIOR COLLEGES IN PROVIDING NON-TRANSFER AGRICULTURAL EDUCATION IN CALIFORNIA.

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INFORMATION FOR THIS STUDY WAS OBTAINED FROM A SURVEY OF CALIFORNIA JUNIOR COLLEGES OFFERING AGRICULTURAL TRAINING FOR THE TERMINAL STUDENT, AND FROM FORMER STUDENTS. EXAMINATION OF THE NUMBER AND TYPE OF COURSES OFFERED, STUDENT EDUCATIONAL BACKGROUND, AND EMPLOYMENT RECORDS OF FORMER STUDENTS INDICATES THAT 1) AGRICULTURAL EDUCATION HAS BEEN PRIMARILY GEARED TO THE NEEDS OF THE TRANSFER STUDENT, 2) COURSES IN TECHNICAL AGRICULTURE HAVE PROVED TO BE MOST USEFUL TO FORMER STUDENTS, PARTICULARLY IF SUCH COURSES HAVE BEEN BASED ON THE NEEDS OF THE LOCAL AGRICULTURAL COMMUNITY, 3) PLACEMENT AND FOLLOWUP OF THESE STUDENTS HAVE BEEN NEGLECTED, AND 4) THERE IS LITTLE EVIDENCE OF DUPLICATION OF EFFORT BETWEEN THE JUNIOR COLLEGE AND STATE COLLEGE PROGRAMS OF TERMINAL AGRICULTURAL EDUCATION. (THIS ARTICLE APPEARED IN THE JOURNAL OF THE NATIONAL ASSOCIATION OF COLLEGES AND TEACHERS OF AGRICULTURE, 8/96-98, DECEMBER 1964.) (AL)

What do we Know About Stu

DEPARTMENTAL TOPICS:

Editorial

ON AIMS AND PURPOSES OF NACTA. Our constitution sets forth the following purposes for which NACTA was formed: 1. to coordinate and improve college teaching in agriculture, 2. to make available college instruction in agriculture to the greatest number of people, 3. to encourage and promote research in agriculture among members of the association.

As the organization continues, it becomes possible to define the above basic aims in more detail. Amplification of the first objective is proffered under the following topics: publication of NACTA **Journal** teacher recognition program, and annual conference.

Publication: It is the desire of the organization and the editorial staff of the **Journal** to provide a publication that will be helpful to the classroom teacher by presenting articles covering topics that treat all aspects of teaching such as methods, problems, philosophy and rewards. The total offering would include something for every agriculture teacher regardless of the size or sphere of his institution. These articles would be authored by outstanding classroom teachers, guidance counselors, administrators and other interested and qualified persons from the whole field of agriculture.

Teacher recognition. It is the desire of the organization, and the committee working on this matter, to develop criteria for discovering outstanding teachers and to provide an avenue through which they may be given appropriate recognition and reward.

Annual Conference: The annual conference offers the classroom teacher an opportunity to meet with his teaching colleagues, administrators and researchers when the teacher and teaching is the paramount interest.

We call upon all agriculturists to help the National Association of Colleges and Teachers of Agriculture an organization that encompasses all agriculture workers and gives the instructor a teacher-centered association in which to work and improve his teaching performance.

News Items

Fresno State . . .

Lloyd Dowler, dean of agriculture at Fresno State College, reports that the division of agriculture has enrolled a record-breaking total of 480 students for the fall term. The figure represents an 11 per cent increase over the fall 1963 total and is above the previous record enrollment of 453 set in the fall of 1962.

"This total reflects only the enrollment of students who have declared agriculture as their major and does not give the true picture of total enrollment in agricultural classes," Dowler said."At the end of the first two days of registration 1,284 students has enrolled in the 83 agricultural courses."

The record enrollment of majors includes 169 seniors, 129 juniors, 70 sophomores, 111 freshmen and one graduate student.

"The most popular major is agribusiness with 116 students selecting this field with options in either animal science, plant science or agricultural mechanics," the dean said. "The agribusiness curriculum combines 30 units of business training with from 39 to 41 units of subject matter in agriculture. The second most popular major is animal husbandry with 107 students followed by agronomy with 71 majors."

Other major fields and the number of students enrolled are: general agriculture, 70; viticulture and enology, 34; dairy science, 21; horticulture, 20; agricultural mechanics, 19; agricultural inspection and service, 9; poultry husbandry, 7; and ornamental horticulture, 5.

Southwest Missouri State College: The 26th Annual Agricultural Improvement Program was held at Southwest Missouri State College on November 4, 5 and 6, 1964.

Southwest Missouri State College: The Southwest Missouri Agriculture staff has resumed the publication of **Agriculture News** after a lapse of two years in its 16-year history. It will be published every two months during the regular year.

Southwest Missouri State College: A $12,000 Kjeldahl nitrogen and distillation apparatus has recently been installed in the SMS Soils Laboratory.

Southwest Missouri State College: Two members of the agriculture faculty at SMS recently received doctor of philosophy degrees from the University of Missouri. They are Dr. J. N. Smith, Professor of Agriculture and Dr. Vernon E. Renner, Assistant Professor of Agriculture.

Louisiana Tech: Representatives of the Colleges of Agriculture from the State Colleges and Universities of the State met at Louisiana Tech on November 20 and 21, 1964 to discuss the existing agriculture curricula in these institutions.

Those present and the institutions represented included:

Dr. Hal B. Barker, Dean School of Agriculture, La. Tech.

Dr. Ralph Fell, Head. Dept. of Agriculture, Northwestern

Dr. Howard Hanchey, Director of Resident Instruction, L.S.U.

Mr. Onis Hyatt, Head, Department of Agriculture, McNeese State College

Dr. John H. Mitchell, Professor of Voc. Agriculture, U.S.L.

Mr. L. L. Price, Head, Department of Agriculture, Northeast State College

Dr. Thomas J. Stanly, Dean, Division of Applied Science, Nicholls State College.

Dr. Hanchey led the group in discussion of the following topics: course offering, curriculum, personnel and placement.

The next meeting of the group will be held in March on the L.S.U. campus with the plant science personnel in the colleges of agriculture being invited to participate in a study of the courses offered in this field.

Louisiana Tech: In tribute to the memory of the late Dean M. Hayne Folk, Jr., a scholarship of $150 a year has been established by his niece, Patricia Coates of Monroe, a senior in education at the college here. The annual award will amount to the interest to accrue from a sum of $3,750.00 deposited with the Tech Alumni Foundation.

Louisiana Tech: Two agriculture students, Joe M. Lee of Shongaloo, Louisiana and William R. Moore of Ruston, Louisiana were named to Who's Who Among Students in American Colleges and Universities.

Agricultural Engineering

Dr. Fred E. Beckett, Editor

The Use of High-Speed Computers for Solving Linear Programming Problems in the Agricultural Industry

By K. R. Tefertiller
Texas A&M

INTRODUCTION

The linear programming technique has been widely used in the Agricultural Industry for several years. However, the arrival of the high-speed computer has greatly increased the feasibility of using Linear Programming for solving large complex problems.

Linear programming is a mathematical tool which can be used to give concrete answers to certain types of practical problems. However, not all problems in the agricultural industry or in economics in general are types of problems that can be solved by linear programming. What can be solved by linear programming? There are **three** necessary requirements for a problem to be adaptable to linear programming. **First,** there must be some objective or goal which can be maximized or minimized. **Second,** there must be at least one factor that is fixed or in limited supply. For example, in a farm situation quite often capital or land or both are factors which are fixed in supply. **Third,** there must be more than one way to attain the objective that is specified. For example, in a farm situation where there are scarce amounts of certain resources, there are many different ways for us to obtain profit on a farm. There are various field crops, and livestock enterprises such as beef cattle or poultry. Therefore, one type of problem that can be solved with linear programming would be that of finding the most profitable combination of enterprises for some particular farm situation. Let us assume that there is some particular farm with 300 acres of cropland, 1000 hours of labor, and 20,000 dollars of operating capital. These would be the restrictions that I mentioned earlier. Let us assume that the farmer is interested in maximizing profit and this would be his goal or objective and it is something that we can measure in terms of quantitative (in dollars and cents). So the first two requirements for linear programming problem have been satisfied. There must be more than one way to produce profit on a farm and this is not an unrealistic assumption on most farms. For instance on most Texas farms there is a possibility of using your limited land and capital in many different ways. You can produce field crops such as grain sorghum or cotton or many different livestock enterprises such as dairy, beef, poultry. Hence, linear programming could be used to find the most profitable combination of enterprises and this would be that combination of enterprises which would make the most efficient use of the limited resources which the farmer has available. I might add that one of the limitations in using liner programming for finding the most profitable combination of enterprises is in the technique itself, but perhaps a more serious limitation is the difficulty in obtaining adequate data for a given operation. This points out the need for more and better designed records of our farm businesses.

An example of how linear programming has been used in the poultry industry is finding a least-cost feed mix subject to specified requirements such as the amount of protein, the amount of fiber, the amount of fat that is needed. The problem shown in Table 1 is an example of a feed mix problem. It is a problem of finding the combination of the ingredients or nutrient sources which will give the least cost for a ton of this feed mix given specified restrictions and feed prices. In this particular case, there has to be not more than 8% fiber, at least 35% protein and at least 1.5% fat. **Second,** we see across the top that there are four different sources of nutrients from which the ton of feed mix can be made. In this particular case we have alfalfa meal, distillers solubles, fish meal and soybean meal as sources of nutrients. Also, we find that the cost per ton of each of these feeds is listed at the bottom of the table and this is the objective to be minimized. As we examine this problem, we see that all the components of a linear programming problem are present. We have an objective that is to be maximized or minimized and in this case it is to determine minimum cost for a specific ration. **Second,** there is at least one restriction in this case, to be exact, there are three restrictions. **Third,** there is more than one way to produce this particular ration. We have 4 different nutrient sources.

Now let us examine the solution for this particular problem. (Table 2.) We find the solution is made up of only three of the four possible nutrient sources. **First,** 14 percent (280 lbs.) of the ton of feed is made up of alfalfa; 55 percent (1100 lbs.) of the ton of feed is made up with soybean meal; and 31 percent (620 lbs.) of the ton of feed is made up with distilled soulbles. This combination of nutrient sources is equal to 2000 pounds of feed. All the restrictions have been satisfied. Exactly 8% of the ration is made up of fiber and exactly 35% of the ration is protein. Although 1.5% fat was the minimum requirement in this problem, 2.4% of the optimal feed mix is made up of fat. This does not violate the restriction because you recall that we had to have at least 1.5% fat. Hence, every restriction has been satisfied and this is the least-cost

ration given the restrictions and feed prices. T is $ the r om- b ge. F ire- n 7% fi cost o and i at l ease t for p ion c the requirement had been 30% instead of 35% protein, the ration cost would have been increased by ion fu on. T nic c in r um a ons a of c uld b on- s ke- w ow s ges due to changes in prices of certain ingredients.

In conclusion, I would like to stress that even th is us ns, it for ge ral in ro- gr ni- ta m- in in so ter te we ha or- ta

TABLE 1.

Basic Data Required for a Least-cost Feed Mix Problem

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Nu / Sou		
Al		4
Di		2
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Junior Colleges . . .

H. M. McKenzie, Editor

A Study of the Status and Role of the Junior Colleges in Providing Non-Transfer Agricultural Education in California

Ralph M. Vorhies

The major purpose of this study was to determine the past, present, and possible future of the California junior colleges in providing non-transfer agricultural education. An attempt was made to learn how extensive this type of training is in the junior colleges in the state. Information secured from the colleges and the former students included: (1) the number and type of courses offered, (2) the student's educational background, and (3) the employment record of the former students. Students who entered the program in 1959 were used for the study. Whenever the former students gave permission employers were asked to give their opinion of the employee and his training.

1. SUMMARY OF THE DATA

History

Agriculture has been taught in the junior colleges of California from the very beginning of the system. In 1910 when the Fresno School District established the first public junior college, agriculture was in the curriculum.

The number of junior colleges offering agriculture courses has declined somewhat in recent years, and at present only 19 are offering agriculture. These colleges are widely scattered in all of the agricultural areas of the state, but the greatest number are located in the Los Angeles area and in the San Joaquin Valley.

Enrollments in agriculture are increasing slowly, but not as rapidly as the total college enrollment.

The Extent of the Non-transfer Program

Many of the junior colleges in California that offer agriculture teach only transfer courses which are planned to parallel the courses of the four-year agricultural college to which most of their students transfer.

Some junior colleges have special non-transfer courses in English and mathematics for terminal students, but few offer separate courses in agriculture designed to fit the needs of the non-transfer student.

Recently at least two of the junior colleges, Modesto Junior College and Mount San Antonio College, have begun to offer special terminal curricula for training agricultural technicians. The surveys made by these colleges and reviewed in Chapter II have demonstrated a need for such training.

Most of the junior colleges studied had adequate facilities for offering non-transfer courses in agriculture that would fit students for work in the related agriculture field.

The staff in agriculture at the 10 junior colleges varied from two to 11 with an average of 4.4 instructors. Nearly all of the full-time instructors had the master's degree, and they had considerable experience as teachers of vocational agriculture in high school or as workers in production or related agricultural fields.

* Unpublished Doctoral dissertation, University of Missouri, Columbia, 1964

The enrollment in the non-transfer program was diffcult to determine since accounting practices differ at the different colleges. Some of the larger junior colleges had over 200 students in agriculture, and in some cases at least one-half of them were considered to be non-transfer students.

Nearly of the junior colleges in the survey had school farms. Some of the colleges provided work experience courses, and students were encouraged to carry out productive projects either on the school farm or on the student's own farm. One college required such projects of all their agriculture students since the college received part of its support from federal funds that required such projects.

Students' Background and Objectives

The study revealed that 78 per cent of the students surveyed had a rural background. Approximately one-half of the students had taken courses in vocational agriculture in high school. The proportion that had vocational agriculture in high school varied depending on the location of the junior college. Those in the Los Angeles area reported only 10 to 20 per cent as having such course, while one San Joaquin Valley college estimated that 75 per cent of their students had such courses. Very few students had courses in general agriculture in high school.

It has been reported many times that two-thirds of the students entering junior college expect to transfer to a four-year college, but only one-third of the students do transfer. The findings of this study are in line with this statement. Forty per cent expected to finish a four-year course, and another 50 per cent expected to finish the two-year course when they entered junior college. Actually only about 25 per cent finished the two-year course.

Drop-out is high from this program. Nearly one-fourth of the students did not finish even one year at the junior college. The major reason for dropping out was given as financial. Thirty-two per cent of the drop-outs gave this reason, although some of the agricultural teachers and counselors doubted that it was the real reason in many cases.

Community Influence on Course Content

The courses in agriculture often reflect little of the agriculture of the community. This is due to the need of the majority of the students for specific courses that will transfer to a four-year agriculture college.

The non-transfer courses and especially the agricultural technician training programs should reflect the agricultural needs of the community. Most of the graduates of the non-transfer program who enter agriculture remain in the service area of the college. This seems to have been considered in setting up the existing technician training programs. These curricula and the course content have in most cases been based on community surveys, and have been selected with the aid of advisory committees from the related agricultural industries of the community.

It has also been recognized that the transfer courses presently being taught in the junior colleges are not suitable to meet the specialized needs of students training to become agricultural technicians.

Placement History

The junior college placement services are confined largely to locating part-time jobs for present students. They have done very little placement of drop-out or terminal agricultural students. Placement of these students has been left to the agricultural department personnel, and even they do not usually have an organized method of bringing the students and the employers together. Replies from 50 former non-transfer students regarding initial job placement revealed that 35 per cent went into production agriculture. Another 35 per cent entered jobs not related to agriculture at all, and about 30 per cent entered related agriculture employment.

A study of present employment showed that 23 per cent were self-employed. Of the 37 not self-employed five were in on-the-farm agricultural jobs and 13 were in off-the-farm related agricultural jobs. The 19 students who did not go into agricultural work are employed in a wide variety of jobs.

Information was sought regarding the number of job changes made since leaving college. Less than one-half of the former students had changed jobs at all, and of those who changed, 50 per cent had only changed once.

The mean monthly salary on the first job after leaving college was $328.51. The mean salary for the present job at the time the former student began to work at it was $352.16, and the present monthly salary for all former students not self-employed was $413.63. The salary range for present jobs was from $175 to over $600.

As a group the junior college students earn about $50 a month less than the two-year technical graduates from the state college agricultural programs. However. the junior college students as a group had much less college training than the state college graduates.

Most of the former students felt that their junior college work had helped them to advance faster and farther than they could have done without it. This was especially true of the technical agricultural courses they had taken. However about one-half of the former junior college students felt that a four-year course in their field would have helped them even more.

Employer's Opinions

The results of the employer opinion survey indicated that in general the employers were fairly well satisfied with the former non-transfer students as employees. Sixty-nine per cent said that they would hire more students from such programs. About one-half of the students had been hired primarily because of their college training. A little more than one-half of the employers felt that a four-year degree would have made the employees more successful on the job.

The technical agricultural courses seemed to be the part of the employees' training that contributed most to the job. There was no well defined recommendations regarding areas of deficiency in the college training program that the employers felt should be corrected.

The Program at Four-year Colleges

Terminal agricultural training at other colleges in California was found at only three of the state colleges. These colleges are Fresno State College, Chico State College, and California State Polytechnic College at the San Luis Obispo campus.

Two of these colleges have a two-year program, and one has a three-year vocational program. California Polytechnic College has the most extensive program with 13 fields of specialization, and about 380 students enrolled in 1963. Animal husbandry is the most popular major, and in some colleges accounts for over one-half of the enrollment.

One of the three colleges offers special courses in English, biological science, political science, and agriculture for the two-year students.

Admission into the two-year program in agriculture is more difficult at the state colleges than it is at the junior colleges. Increasing entrance requirements and rising costs are turning some prospective students away from the state college program.

The demand for graduates of the two-year programs is good, but not as good as for the four-year graduates.

Very few courses designed especially to train agricultural technicians are being taught at the state colleges.

II. CONCLUSIONS

1. Agricultural education in California junior colleges has been quite

successful in the area of transfer education for students going on to four-year colleges, but in general the non-transfer students have been neglected.

2. Courses in technical agriculture have been of value to former non-transfer students and were recognized as valuable by the students and employers alike. This is indicated by the employer's willingness to hire students from the program and to advance them.

3. The placement and follow-up of non-transfer students in agriculture has been given minimal attention. A need also exists for some curricular changes to better fit these students for agricultural jobs where their rural background and training would be fully utilized.

4. Agricultural technician training program similar to those recently started at Modesto Junior College and Mount San Antonio College have much value. They are based on and meet local agricultural needs of the community. These programs also fulfill important needs for junior college agricultural students not planning to transfer to a four-year college.

5. There seems to be little duplication of effort between the junior college and state college programs of terminal agricultural education.

III. IMPLICATIONS

Some of the possible implications that may be drawn from this study of the non-transfer agricultural program in the California junior colleges are now presented.

This study seems to point to a continued demand for well-trained agricultural workers both in production agriculture and in related agricultural occupations. There needs to be greater stress on training for related agricultural occupations since it is in this field that most of the job openings exist.

The investigation also indicates that the junior college agricultural programs now in existence have an important role to play in the training of these workers. However, before the junior colleges can become fully effective in this training they must greatly expand their placement and follow-up work with the non-transfer students in agriculture. There seems to be considerable need for better communications between the junior colleges and related agricultural industry.

It appears that the training program for agricultural technicians has made a good start in California junior colleges and may well become a major part of their offering in agriculture.

The stiffening entrance requirements and the increasing cost of attending the university and the state colleges may lead to even larger gains in enrollment in the agricultural program at the California junior colleges.

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